

AERONAUTICAL MATERIAL SPECIFICATION

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COMPOUND, CORROSION-PREVENTIVE Hard Film, Hot Application

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. TYPE: A stable, non-volatile, petroleum base compound suitable for application by dipping at 170-210 F.
3. APPLICATION: Preservation, during extended periods of shipment and/or storage, of miscellaneous metal parts, tools, sub-assemblies, and equipment where the compound is readily accessible for removal and removal does not damage the parts.
4. TECHNICAL REQUIREMENTS:
 - 4.1 Abrasiveness: Compound shall not contain abrasive substances.
 - 4.2 Toxicity: Compound shall contain no materials of known toxicity. The vapor shall not cause discomfort or injury to workmen engaged in the application of the compound.
 - 4.3 Coverage: Compound shall provide a continuous, completely protective film on metal parts under normal conditions of storage in all climates.
 - 4.4 Setting: Compound as applied to metal parts shall set to a firm, hard film in 24 hr at room temperature (77 F $\pm$ 7) and, after 120-hr setting, shall not have checked or cracked so as to expose the metal surface underneath.
 - 4.5 Removability: Compound shall be readily removed by dipping in, or spraying with, Petroleum Solvent, AMS 3160, or by wiping with cloths saturated with the solvent.
 - 4.6 Corrosion: Compound shall not corrode polished steel, copper, magnesium, aluminum or cadmium plate when maintained in contact with those metals for 4 hr at 210 F.
 - 4.7 Properties: Compound shall conform to the following requirements; tests shall be performed in accordance with listed ASTM methods:

Property	Value	Test Method
Melting Point, deg Fahr	150-170	ASTM D127-49
Flash Point, deg Fahr, min.	350	ASTM D92-46
Consistency	30-90	ASTM D217-48

- 4.8 Percentage of Non-Volatile Matter: Compound shall contain not less than 99.0% (by weight) non-volatile matter when determined as follows:

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- 4.8.1 Five grams of compound shall be weighed to the nearest milligram into a tared evaporating dish and the dish and contents heated for 24 hr in an oven at 221-230 F. After heating, the dish shall be cooled to room temperature and reweighed, and the non-volatile matter calculated from the residual weight.
- 4.9 Lead Solubility: Compound shall not cause a change in weight of a lead specimen of more than 5 mg per sq in. when tested as follows:
- 4.9.1 A 1x1x1/16-in. polished specimen of lead sheet shall be accurately weighed and immersed for 4 hr in 50 g $\pm$ 1.0 of compound maintained at 205-210 F. Specimen shall be removed, cleaned with solvent, and reweighed. Change in weight per square inch shall be calculated from the change in weight and the total area of the specimen.
- 4.10 Loss on Heating: Compound shall not lose more than 5.0% in weight when tested as follows:
- 4.10.1 Two 2x4x1/16-in. polished and alkaline-cleaned panels of low carbon steel sheet, AMS 5042 or equivalent, shall be weighed to the nearest milligram. Panels shall be immersed for 1 min. in compound at 205-210 F, withdrawn and suspended vertically in an atmosphere of not more than 60% relative humidity at a temperature of 77 F $\pm$ 7 for 24 hr. Panels shall be weighed to determine the weight of the coating and then suspended for 4 hr in an oven at 135 F $\pm$ 1. After heating, panels shall be carefully removed from the oven, allowed to cool to room temperature and reweighed. The percentage loss shall be calculated from the loss in weight and the original weight of coating.
- 4.11 Acidity: Compound shall show no evidence of the presence of inorganic acid when tested as follows:
- 4.11.1 Twenty-five to 50 g of compound shall be introduced into a 250-ml separatory funnel followed by 100 ml of boiling distilled water. The funnel shall be shaken vigorously and after compound and water have separated, the water layer shall be drained into a 500-ml casserole. Compound in the funnel shall be washed twice by vigorously shaking with 50-ml portions of boiling distilled water. After each washing and separation, the water layer shall be drained into a casserole. One drop of 1% solution of phenolphthalein shall be added to the 200 ml of accumulated water and the water then boiled. A change in color to pink indicates the solution is alkaline. If addition of phenolphthalein causes no change in color, two drops of 0.1% solution of methyl orange shall be added. A change to red or pink in such instances indicates the presence of inorganic acid.
- 4.12 Rosin: Compound shall show no evidence of the presence of rosin when tested as follows:
- 4.12.1 Twenty-five ml of 95% ethyl alcohol shall be added to 10 g of compound and the mixture heated to boiling. One or two drops of the solution of compound in alcohol shall be placed on a porcelain spot-plate with three or four drops of acetic anhydride. Subsequently, one drop of chemically pure sulfuric acid shall be added. A rose-violet coloration, or a flash of purple produced when the acid meets the anhydride, indicates the presence of rosin.
- 4.13 Stability: Compound shall remain homogeneous with age and when tested as follows:

4.13.1 A sample of compound shall be placed in a test tube, heated to $220\text{ F} \pm 2$ and maintained at that temperature for 1 hour. Tube and compound shall be cooled at room temperature for 1 hr, then further cooled to $-40\text{ F} \pm 2$ and maintained at that temperature for 1 hour. Tube and compound shall be reheated to $220\text{ F} \pm 2$ and maintained at that temperature for 1 hour. Compound, after returning to room temperature, shall be examined for homogeneity.

4.14 Wetting Properties and Low Temperature Adhesion: Compound shall thoroughly wet the surface of test panels, shall form a smooth, unbroken film, and shall evince satisfactory adhesion when tested as follows:

4.14.1 Two 2x4x1/16-in. polished and alkaline-cleaned panels of low carbon steel sheet, AMS 5042 or equivalent, shall be immersed for 1 min. in compound at $205\text{--}210\text{ F}$, withdrawn and suspended vertically in an atmosphere of not more than 60% relative humidity at a temperature of $77\text{ F} \pm 7$ for 24 hours. Panels shall be cooled to $0\text{ F} \pm 2$ and maintained at that temperature for 1 hour. While at $0\text{ F} \pm 2$, four parallel scratches about 1/8 in. apart and 1 in. long shall be made in the compound film with a pointed knife blade and four similar scratches which intersect the first four at right angles. There shall be no flaking of the film within the area bounded by the scratches.

4.15 Humidity Protection: Compound shall protect metal panels from corrosion and pitting for 28 days when exposed to humid atmosphere as follows:

4.15.1 Test panels 2x4x1/16-in. shall be prepared. There shall be two freshly sand-blasted panels and two polished and alkaline-cleaned panels of low carbon steel sheet, AMS 5042 or equivalent, and two polished panels of aluminum alloy sheet, AMS 4037. All panels shall be immersed for 1 min. in compound at $205\text{--}210\text{ F}$, withdrawn and suspended vertically in an atmosphere of not more than 60% relative humidity at a temperature of $77\text{ F} \pm 7$ for 24 hours.

4.15.2 After the 24-hr conditioning in 4.15.1, all panels shall be suspended vertically in humid atmosphere for 28 days in accordance with ARP 362 (Humidity Cabinet). Upon completion of the exposure, panels shall be removed from the cabinet, cleaned with solvent, and examined. Visible corrosion or pitting of any surface shall be cause for rejection of the compound. If corrosion occurs, but to no greater extent than three spots no larger than 1 mm in diameter, the compound may be retested. If, on retesting, no corrosion spots occur, the compound shall be acceptable. In any case, corrosion within 1/8 in. of an edge shall be disregarded.

4.16 Salt Spray Protection: Compound shall protect metal panels from corrosion and pitting for the times listed below when exposed to salt spray as in 4.16.1 and 4.16.2.

Panel Material	Protection Time, Days, Min
Sand Blasted Steel	7
Polished Steel	7
Polished Aluminum	28